

CLAIMS

1. A nanostructure in the form of a mixture film which comprises a plurality of cylinders comprising Al as a major constituent, and a matrix
5 region surrounding the plurality of cylinders and comprising Si and/or Ge,

wherein the total amount of Si and Ge is contained in a proportion in the range from 20 to 70 atomic % in the mixture film; the cylinders are
10 orderly arrayed; the diameter of the cylinders is in the range from 1 to 30 nm; and the interval between the cylinders is 30 nm and less.

2. The nanostructure according to claim 1, wherein the cylinders are orderly arrayed in a
15 honeycomb array.

3. The nanostructure according to claim 1, wherein the proportion of the total amount of Si and Ge in the mixture film is in the range from 25 to 65 atomic %.

20 4. The nanostructure according to claim 3, wherein the proportion of the total amount of Si and Ge in the mixture film is in the range from 30 to 60 atomic %.

5. The nanostructure according to claim 1, wherein the average diameter of the cylinders is in
25 the range from 2 to 8 nm.

6. The nanostructure according to claim 1,

wherein the interval between the cylinders is 10 nm or smaller.

7. The nanostructure according to claim 1, wherein the matrix region is comprised of amorphous Si and/or amorphous Ge.

8. The nanostructure according to claim 7, wherein the matrix region is amorphous Si.

9. The nanostructure according to claim 1, wherein the matrix region is comprised of amorphous Si and amorphous Ge.

10. The nanostructure according to claim 1, wherein the mixture film is formed on a substrate.

11. An electronic device according to claim 10, comprising wiring on part of the substrate.

12. A method of manufacturing a nanostructure in the form of a mixture film having a plurality of cylinders having a diameter in the range from 1 to 30 nm and an interval of 30 nm and less and comprising Al as a major constituent, and a matrix region surrounding the plurality of cylinders and comprising Si and/or Ge, the method comprising the steps of:

forming an ordered region for growing Al with priority on a substrate, and thereafter

forming the mixture film which has Al and Si and/or Ge and in which the total amount of Si and Ge is contained in a proportion in the range from 20 to 70 atomic %, to fabricate the mixture film.

13. The method of manufacturing a nanostructure according to claim 12, wherein the ordered region is a region having a honeycomb array or a pattern corresponding to part of the honeycomb array.

5 14. The method of manufacturing a nanostructure according to claim 13,

 wherein the honeycomb array or the partial region of the honeycomb array is a graphite array.

10 15. The method of manufacturing a nanostructure according to claim 12, wherein the ordered region for forming Al with priority includes a projection having Al as a major constituent.

15 16. The method of manufacturing a nanostructure according to claim 15, wherein the projection having Al as a major constituent is fabricated by anodization of a film having Al as a major constituent and etching of anodized Al film.

20 17. The method of manufacturing a nanostructure according to claim 12, wherein the method of forming the mixture film is a film forming method of forming a substance in a nonequilibrium state.

25 18. The method of manufacturing a nanostructure according to claim 17, wherein the film forming method of forming a substance in a nonequilibrium state is sputtering.

 19. The method of manufacturing a nanostructure according to claim 17, wherein the substrate

temperature in film forming of forming a substance in a nonequilibrium state is 200°C or lower.

20. The method of manufacturing a nanostructure according to claim 12, wherein the total amount of Si
5 and Ge is a proportion in the range from 25 to 65 atomic %.

21. The method of manufacturing a nanostructure according to claim 12, wherein the total amount of Si
and Ge is a proportion in the range from 30 to 60
10 atomic %.

22. The method of manufacturing a nanostructure according to claim 12, wherein the matrix region is Si.

23. A structure comprised by a first material
15 and a second material, characterized in that a columnar member comprised by the first material is surrounded by a region comprised by the second material, that the second material in the structure is contained in a proportion in the range from 20 to
20 70 atomic % of the total amount of the first material and the second material, and that the columnar member is placed on a growth starting portion provided in advance.

24. A method of manufacturing a structure,
25 characterized by having a step of preparing a substrate having a growth starting portion, and a step of forming a structure having on the substrate a

columnar member comprised by a first material and a region comprised by a second material and surrounding the columnar member, the second material being contained in a proportion in the range from 20 to 70
5 atomic % of the total amount of the first material and the second material in the structure.